

PhD Thesis: Personality Dimensions in the Etiopathogenesis of Primary Hypertension

PhD Student: Keszegpal (Lakatos) Eva-Katalin

PhD Coordinator: Prof. Dr. Aurel Nireştean

Although hypertension is the most important risk factor (RF) for the development of cardiovascular diseases (CVD), we still do not understand all the factors that contribute to the disease onset. However, although more and more evidence can be found to corroborate that beside the physiological, genetic and psychosocial factors, personality also plays a major role in the etiology of hypertension, none of the hypertension risk predictor models consider personality as a predictor of the development of hypertension, and only a few studies directly examine whether a relationship between hypertension and personality exists. The precise mechanism by which personality influences the appearance of hypertension is uncertain.

Personality can be described by 5 basic personality traits/dimensions, known as the Five-Factor Model (FFM) or the Big Five personality traits: N- emotional stability/neuroticism, E- extroversion, O-openness to experience, A-agreeableness and C-conscientiousness. The FFM is the dimensional approach to describing adaptive and maladaptive personality characteristics. Another approach to characterize personality is the categorical approach, where an individual can be described as having a type D “distressed” or a non-type D personality. Type D personality was recognized as a significant negative prognostic factor for patients with CVD, particularly in the case of coronary heart disease, overlooking the potential relationship between personality and hypertension, the most critical and reversible risk factor for CVD.

The results of the few studies directly investigating the relationship between personality traits and essential hypertension are inconsistent. While on one hand evidence suggests that lower levels of conscientiousness and agreeableness, and high neuroticism, affective temperaments, as well as type D personality seem to associate with hypertension, other studies seem to find no correlation.

Based on these insights, the aim of the present thesis was to examine whether the personality dimensions described in the FFM are associated with primary hypertension respective with the risk factors for hypertension. The personal contributions consist in two separate studies conducted at the Emergency Institute for Cardiovascular Diseases and Transplantation, Targu Mures, Romania.

The purpose of the first study was 1) to examine how personality dimensions, as described in the FFM, differ between normotensive and hypertensive individuals, 2) if personality dimensions could be considered as risk factors for the development of hypertension and 3) if personality structure influences the severity of hypertension.

The purpose of the second study was to examine whether personality dimensions have an influence on educational level and life-style factors, such as physical activity, smoking status and obesity, which are known as risk factors for hypertension.

Materials and methods

In total, 310 participants were recruited in a case-control design. The association of personality dimensions with primary hypertension was examined in normotensive (n=156) and hypertensive (n=120) patients following assessment of the 5 personality dimensions with the DECAS Personality Inventory. A binary logistic regression model was used to assess the predictive value of personality traits for hypertension, controlling for recognized confounders such as age, gender, obesity, smoking history, parental history of hypertension, and education. To examine the effect of personality dimensions on obesity, physical activity and

smoking history, a binary regression model was created using the personality dimensions as independent variables, and the age, gender, obesity, smoking history, physical activity, educational level and hypertension as confounders. In the case of educational level a multivariate regression model was created. To test our model for goodness of fit, both Hosmer-Leshow and R^2 were calculated. The significance level was established as $p < 0.05$.

Results

The results of the first study showed that low or very low emotional stability was almost twice as frequent in the hypertensive group (71.7%) as in the normotensive study population (43.5%). The binary logistic regression model showed that low emotional stability is a significant predictor for hypertension, the risk of being hypertensive decreasing by 7% with each point increase on the emotional stability score, independently of the presence of confounders. Very low or low emotional stability increased the odds of being hypertensive by 3.55 times (odds ratio: 3.55, 95% CI: 2.18-9.35, $p < 0.001$). Our regression model has also confirmed the predictive value of the confounders known from the literature. Each increase in age by one point increased the odds of being hypertensive by 13.5%. Women were found to be 55.6% less likely to develop hypertension than men. Having a parenteral history of hypertension made it 3.43 times more likely to be hypertensive. Being obese made it 2.21 times more likely to be hypertensive. No association between the severity of hypertension and personality traits was found.

The second study demonstrated that all five personality dimensions had an influence on obesity. High openness and low agreeableness increased the odds of being obese 3.33 times and 2.33 times respectively. High emotional stability, agreeableness and conscientiousness and low extroversion significantly decreased the probability of obesity. High agreeableness increased the probability of physical activity by 58%, whereas low extroversion by 52%. Individuals with high agreeableness or openness were 12.35 and 14.54 times more likely to have obtained higher educational levels than their counterparts with low agreeableness or openness levels.

Conclusions

The work presented in this thesis demonstrates the relevance of personality dimensions in the development of hypertension. Persons with low emotional stability/high neuroticism have more than 3-fold increased risk of developing primary hypertension and a one point increase in emotional stability score decreases the risk of hypertension by 7%. Our results are in accordance with the current literature supporting that, individuals high in neuroticism have a higher risk of developing hypertension. Similarly, high levels of neuroticism were significantly associated with CVD mortality, however, these studies do not report on the relationship between neuroticism and hypertension, despite hypertension being the most relevant RF for CVD.

At the same time, we demonstrate that personality dimensions can potentially contribute to the development of HTA not only directly, but also indirectly, through their influence on life style factors, such as obesity, physical activity and educational level, recognized risk factors of hypertension.

Longitudinal, prospective studies investigating the potential beneficial effect of early, tailored psychological interventions in disease prevention are necessary. Such studies could provide highly valuable information especially for prehypertensive patients, with high normal blood pressure, where lifestyle changes may have the potential to reduce the risk of progressing to established hypertension. Personality assessment should be considered as part of routine care for the prevention and early diagnosis, as well as for the effective treatment of hypertension. I also recommend considering neuroticism as a strong risk predictor for essential hypertension and to be included in future risk predictor models.